

ECE 71 – Engineering Computations in C

Professor Kriehn

Due By: Midnight on Thursday, October 15, 2009

Print out your algorithms and commented code for each of your homework solutions.

HOMework #17 – Dell Discount Policy

Dell needs a program to implement its computer teacher's discount policy. The program is to prompt the user to enter the purchase total and to indicate whether the purchaser is a teacher. The store plans to give each customer a printed receipt, so your program is to create a nicely formatted file called "receipt.txt". Computer teachers receive a 10% discount on their sheet music purchases unless the purchase total is \$100 or higher. In that case, the discount is 12%. The discount calculation occurs before the addition of the 9.975% sales tax. Here are two sample output files – one for a computer teacher and one for a non-teacher.

Specifications:

Define the discount rates and sales tax as constants. Allow the program to enter either uppercase or lowercase letters for the 'Y' or 'N' characters, and print an error condition that will keep repeating if the user does not enter in a proper character. Create a nicely formatted table for the output file, and assume that the total purchase price will not be over \$9999.99. If you execute the program, the following information should be displayed:

```
~> hw12.o
Enter the total purchase price: 10.0
Is the customer a teacher (Y/N)?: Y
~> more receipt.txt
Total Purchases                $ 10.00
Teacher's Discount (12%)       $  1.00
Discounted Total               $  9.00
Sales Tax (9.975%)             $  0.90

Total                          $  9.90
~> hw12.o
Enter the total purchase price: 122.00
Is the customer a teacher (Y/N)?: q
Please enter 'Y' or 'N': x
Please enter 'Y' or 'N': y
~> more receipt.txt
Total Purchases                $ 122.00
Teacher's Discount (12%)       $ 14.64
Discounted Total               $ 107.36
Sales Tax (9.975%)             $ 10.71

Total                          $ 118.07
~> hw12.o
Enter the total purchase price: 24.90
Is the customer a teacher (Y/N)?: N
~> more receipt.txt
Total Purchases                $ 24.90
Sales Tax (9.975%)             $  2.48

Total                          $ 27.38
~>
```

Once you have verified the operation of your program, submit your source code to the Grader Program.

HOMEWORK #18 – Suture Packaging

Sutures are strands or fibers used to sew living tissue together after an injury or operation. Packages of sutures must be sealed carefully before they are shipped to hospitals so that contaminants cannot enter the packages. The object that seals the package is referred to a sealing die. Generally, sealing dies are heated with an electric heater. For the sealing process to be a success, the sealing die is maintained at an established temperature and must contact the package with a predetermined pressure for an established time period. The time period in which the sealing die contacts the package is called the dwell time. Assume that the acceptable range of parameters for an acceptable seal are the following:

Temperature:	150 – 170 °C
Pressure:	60 – 70 PSI
Dwell Time:	2.0 – 2.5 s

A data file called “`suture.dat`” on my website contains information on batches of sutures that have been rejected during a one-week period. Each line in the data file contains the batch number, temperature, pressure, and dwell time for a rejected batch. The quality control engineer must analyze this information, and needs a report that computes the percent of the batches rejected due to temperature, the percent rejected due to pressure, and the percent rejected due to dwell time. It is possible that a specific batch may have been rejected for more than one reason, and it should be counted in all applicable totals. Write a program to compute and print the number of these three percentages as well as the number of batches in each rejection category and the total number of batches rejected. Remember that a rejected batch should appear only once in the field total, but could appear in more than one rejection category. The output of your program should print the results to the screen.

Specifications:

First copy the `suture.dat` file over to your `callisto` account. The easiest way to do this is to download a program called **WinSCP** that allows you to securely copy files from one computer to another. Save the file to your desktop, install **WinSCP**, and use it to copy your data file. Otherwise, create a `suture.dat` file using `nano` and type in the appropriate information (exactly!) to create your data file. If you execute the program, the following information should be displayed:

```
~> hw18.o
Welcome to the Suture Packaging Evaluation Program

Percent Rejected due to Temperature: 33.3%
Percent Rejected due to Pressure: 33.3%
Percent Rejected due to Dwell Time: 50.0%

Number of Bad Batches due to Temperature: 2
Number of Bad Batches due to Pressure: 2
Number of Bad Batches due to Dwell Time: 3

Total Number of Batches Rejected: 6

~>
```

Once you have verified the operation of your program, submit your source code to the Grader Program.